



STATE OF CALIFORNIA

BID SPECIFICATION

TYPE 1 FIRE ENGINE

DEPARTMENT OF DEVELOPMENTAL SERVICES

1.0 SCOPE This specification establishes the requirements for a Type 1 Fire Engine which will be used by fire fighters at Sonoma Developmental Center, Eldridge, CA, to provide rural and structural fire fighting capability, and to assist with medical emergencies. The unit shall be delivered as a “turn-key” product, fully functional and ready to operate.

2.0 SPECIFICATIONS AND STANDARDS The following standards, laws and regulations in effect on the date of the Invitation for Bid form a part of this specification. Each vehicle is required to meet all regulations, standards and laws including revisions, at time of acceptance. The final completed vehicle certification is the responsibility of the firm constructing the body described herein.

1. Federal Motor Vehicle Safety Standards (FMVSS) Federal Highway Safety and DOT
2. California Motor Vehicle Code
3. California Code of Regulations-Title 8, Title 13, Title 15
4. California Health and Safety Code
5. California Air Resources Board Regulations
6. OEM Body Builders Standards and Guidelines
7. NFPA Standard #1901 (Latest Edition)

A plate identifying the manufacturer, tare weight, gross vehicle weight, date of manufacture and all other information as specified in the National Traffic and Motor Vehicle Safety Act, Section 114, and Federal Code of Regulations, Title 49, shall be attached to the vehicle frame or body in an easily accessible location.

Should a conflict arise between an NFPA Standard and any portion of these specifications, the NFPA Standard will prevail.

Any test equipment required or expense incurred for the Certification Tests shall be borne by the Contractor supplying this equipment.

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SECTION 3 - CAB AND CHASSIS REQUIREMENTS

3.1 CARRYING CAPACITY:

The GVWR and GAWR of the chassis shall be ten percent (10%) above that adequate to carry the fully equipped apparatus including a full tank of water and foam solution, the specified hose load, 800 lbs. for personnel, ground ladders, and a miscellaneous equipment allowance of 2000 lbs. GVWR - shall be rated 40,540 lbs. (minimum).

3.2 APPARATUS CHASSIS & BODY DIMENSIONS:

- Four door, flat roof, tilt cab-over style.
- Chassis wheelbase - Not to exceed 165".
- Horsepower/Torque - Minimum of 330 hp/860 ft lbs. torque
- Total overall length - Not to exceed 335 inches.
- Highest point of apparatus - Not to exceed 109".
- Overall body width - Not to exceed **100"** (not including rub rails or mirrors)
- Wall to wall turning circle - Not to exceed 55 feet.
- Angle of approach and departure - 20 degrees (minimum) when fully loaded. Angle of approach and departure shall be the same.

NOTE: All dimensions noted above are estimates and shall be discussed at the pre-construction conference.

3.3 FRONT AXLE:

Heavy duty shock absorbers shall be provided for the front axle. Oil lubricated front wheel bearings shall be provided. It shall be equipped with O.E.M. hydraulic power steering. The axle shall be O.E.M. approved for this application.

3.4 REAR AXLE:

A 24,000 lbs. (minimum) rated capacity at the ground. Rear axle gear ratio to provide maximum desired road speed of 65 miles per hour.

3.5 BRAKES:

A four channel, dual air "ABS" air brake system with maximum capacity available for the axle(s) bid, "S" cam drum brakes and automatic slack adjusters shall be provided. The entire brake system shall meet all Federal and State of California requirements for air brakes.

3.5.1 **Parking Brakes:** Rear wheel spring brakes with spring brake control shall be provided. The parking brake is to be set with "pull" action and released with "push" action and shall also be properly labeled.

3.6 AIR SYSTEM: An air compressor shall be provided as recommended by the OEM. Air intake shall be drawn through the engine air cleaner. The contractor shall use the OEM air tanks supplied with the chassis only if said tanks fit within the body buildup space

constraints. Otherwise, new DOT approved tanks meeting the space constraints must be supplied and installed by the contractor that meet the minimum air volume specifications required by the chassis manufacturer. A Bendix AD-IP air dryer shall be provided.

- 3.7 CAB AND DOORS:** Four door with a flat roof, flat floor, tilt cab built for the fire service. (Spartan Motors Flat Floor, Flat Roof Sierra or equal) Cab width shall be 96". The interior cab color shall be determined at the pre-construction conference.

The lower inside portion of the cab doors shall be covered with smooth aluminum plate with alternating red and white reflective striping per. NFPA 1901, Latest Edition. Vertical surfaces in step well shall also be covered with aluminum tread plate.

3.7.1 Cab Complement:

- OEM air-conditioning with integral heater/defroster and HVAC fresh air filter.
- OEM bug screen mounted behind the grille.
- Driver's Seat: Air ride driver's seat high-back style (Seats Inc. 911 or equivalent).
- Front Officer Seat: One (1) air ride SCBA seat (Seats Inc. or equivalent). This seat shall contain a SCBA filler pad for use when the SCBA is not in use. Air ride adjustments to be on door side.
- Rear Officer Seats: **Two (2)** front facing SCBA seats (Seats Inc. or equivalent). These seats shall contain a SCBA filler pad for use when the SCBA is not in use.
- Safety belts/shoulder harnesses shall be installed for each seating position, with metal-to-metal buckle, positive pelvic restraint where available. All belts and mounting must be FMVSS approved.
- The seat belts shall be "Red" or "Orange", to comply with NFPA standards.
- All cab steps shall be covered with a non-skid surface that meets NFPA #1901 (Latest edition) and illuminated with a door controlled light for safe night time entry.
- The seats shall be upholstered with gray vinyl material.
- The doors shall be equipped with roll down windows. 360 degree visibility shall be provided as possible considering that the body may block visibility to the rear.
- Cab Sound Insulation package.
- Black or grey rubber cab floor covering.
- Tinted glass all windows.
- Stainless steel gear rack installed on the rear wall to provide eight (8) retracting hooks for hanging personal protective gear.
- Tilt steering wheel.
- Arm rest, all doors.
- Two adjustable sun visors.
- Dual electric 2-speed windshield wipers and washers.
- Dual electric horns.
- Fresh air heater and defroster.
- Entry grab handle for each door w/ Anti-Slip rubber inserts. Handles shall be chrome plated or stainless steel.
- Keyed ignition switch shutoff.
- Electronic high idle control.
- Low air (brake) pressure warning device.

- Two electric, bright finish, adjustable, heated, swing away, reset type exterior rear view mirror assemblies with brackets appropriate to cab structure. The mirror heads are to be one piece frame, at least 6" X 16", with a minimum 7.44 sq. inch adjustable convex mirror mounted below mirror head.
- AM/FM radio w/ single disc CD player and weather band with multiple speakers and antenna.
- Full width front bumper, minimum of 8" high to be made of polished stainless steel. Bumper or attachments shall not block the frontal grill intake area.

3.7.2 Engine Access: Access to the motor shall be accomplished by tilting the cab. An electric powered hydraulic tilting mechanism with a manual override shall be provided. The cab shall tilt to a minimum of 45 degrees for motor/transmission access. An interlock shall be provided to prevent cab tilting mechanism from operating when parking brake is released.

3.7.3 Instruments and Gauges: (Minimum Complement) All gauges shall be in dash mounted. Where appropriate, warnings shall be visual and audible.

- Indicating voltmeter.
- Air pressure gauge.
- Oil pressure gauge.
- Engine coolant temperature gauge and low level warning.
- Transmission oil temperature gauge.
- Fuel level gauge.
- Speedometer, with odometer.
- Intake air restriction gauge vacuum activated, meter type, resettable, dash mounted or intake (underhood) mounted air restriction indicator with dash mounted warning light.
- Tachometer, factory installed, dash mounted.
- Engine hour meter.

3.7.4 Electrical System: Electrical system shall be 12-volts with an Emergency and Severe Service Rated Alternator, internally regulated, automatic circuit breaker system protection standard. (300 Amp Lestek Brute; 270 Amp Leece-Neville or equal). All electrical system design components and ratings shall conform to NFPA #1901, latest edition. The electrical system shall include at least the following features:

- Increased alternator output at idle for Fire Service Truck Applications.
- Remote body builder interface for remote engine speed controls.
- Battery disconnect switch positive type, lever operated, mounted on the cab floor driver's side. OEM chassis manufacturer supplied disconnect is acceptable.
- Delco Remy MT 42 starter motor w/ thermal over-crank protection or Delco Remy 41MT Heavy Duty starter motor
- Fan drive override switch.
- 110 volt AC engine block heater for the apparatus engine. An automatic ejecting plug shall be provided on the exterior of the apparatus on or near the pump panel.
- Hi-Lo halogen sealed beam headlights with daytime running lights. The headlights shall be provided with a flash to pass feature.

- OEM clear fog lights or a fog light accommodation package.
- Parking lights.
- Two rear stop and taillights.
- Instrument panel lights.
- Interior (courtesy) dome lighting, door switch operated (on all doors).
- Side marker lights.
- Clearance and identification lights.
- 102 DBA back-up alarm.
- A dash mounted 40 AMP dual output switch that controls hi-amperage loads such as a lightbar and emergency lighting.
- The OEM or body builder shall supply an electrical system that includes "Multiplex" wiring and components. The electrical system shall incorporate the necessary switches with legends to be incorporated by the body builder for application and operation of installed scene or work lights, load sequencing and other devices.
- One (1) antenna base with coaxial cables shall be mounted in the cab roof with weatherproof cap.
- A 12 volt power point for powering cell phones, laptop computers, chargers, etc.
- A hand held, hard wired spotlight with a momentary on/off switch shall be provided on the officer's side.

All electrical switches shall be mounted on a separate switch panel mounted on cab dashboard or above windshield. This panel shall contain a bank of rocker switches with pilot lights. The function shall be imprinted on or adjacent to each switch. Labeling must be two stage backlit for night operation and located for good, unimpeded operator visibility. Switches shall be removable for repair or replacement. This panel must be within close reach of the driver.

3.7.5 Battery Compartment: Four (4) Group 31, 925 CCA (Minimum Rating) batteries with stainless steel, threaded posts shall be wired into the electrical system through a 300 AMP battery disconnect switch. The batteries shall be connected in parallel to the apparatus electrical system. The starter motor cranking circuit for the apparatus and pump engine and primer motor shall not be wired through the battery switch.

The batteries shall be stored in a suitable location isolated from the crew and adequately vented to atmosphere on a stainless steel tray. The batteries may be stored in pairs in different locations if space limitations dictate. The battery trays shall be provided with a Teflon drain tube to route water to the ground without splashing on any part of the apparatus. If the batteries are stored inside a compartment, they shall be provided with slide out trays. **Batteries must be accessible for jump starting without raising cab.**

The batteries shall be new and not reconditioned batteries and shall be stamped with date of manufacture. (AC/Delco or equal)

One of the four (4) batteries shall be a separate, isolated 12 volt battery and shall be supplied and wired into the electrical system for maintaining computer memory. The computer power leads shall be wired to this battery. A battery isolator guard (Cole-Hersee #48160) shall be installed between the computer battery and the other batteries.

1/0 battery cable, free from splices, shall be used to connect the Group 31 batteries to the apparatus electrical system. Crimped-on eye terminal ends shall be provided on the battery cable. (AMP Special Industries "Roto Crimp Tool #600850", no exceptions shall be used to crimp the terminals) The cable jacket and terminal end shall be sealed with heat shrink tubing. Red tubing shall be used on positive and black tubing on negative terminals.

- 3.8 ENGINE:** Shall be an inline six (6) cylinder diesel, turbocharged w/air-to-air intercooling with a minimum of 330 hp, and 860 lb-ft of torque that meets all California Air Resources Board (CARB) emissions requirements for the State of California. The engine air intake shall be equipped with a two stage, dry micron air cleaner with safety element. The air intake shall be equipped with an O.E.M. ember protection screen as per NFPA standards. The engine shall be rated for the Fire Service as defined by the engine manufacturer.

A full flow oil filter meeting the O.E.M. engine mfg's recommendation is required. The engine governor shall be set at the manufacturer's recommended governed speed.

- 3.9 AUXILIARY BRAKING:** An auxiliary braking device that supplements the vehicle wheel braking system and provides the maximum vehicle retardation available for the specified engine/transmission combination shall be provided.

The auxiliary braking device shall be an O.E.M. installed electronically controlled engine compression brake/exhaust brake combination with a two position switch that can be turned OFF in either the LO or HI position. (Ref. Jake Brake)

If a "Jake" style engine brake is not available, an O.E.M. installed hydraulic output retarder with controller for the Allison World Transmission, fully modulated, with manually foot operated control and a dash mounted on-off switch shall be provided.

3.10 TRANSMISSION:

Allison Model EVS 3000 5-speed fire service automatic transmission **without retarder** shall be provided, with push button control. The transmission shall automatically shift into direct drive/lock up, whenever the pump transmission is shifted to pump and drive is selected on the shift control pad. The transmission fluid shall be Allison's "TranSynd" synthetic oil. An automatic transmission cooler located in the bottom tank of the radiator shall be provided. The transmission shall also be equipped with an electronic oil level indicator.

- 3.11 COOLING SYSTEM:** Shall be the manufacturer's maximum option available for the specified engine/transmission combination, thermostatically controlled with a pressure regulated overflow system, and a spin-on type coolant conditioner or 100,000 mile coolant. The system shall be designed to provide maximum cooling efficiency and circulation of coolant when ascending, descending, or parked (engine idling) when the engine is the power source for the fire apparatus high pressure water pump.

An on/off electric engine coolant sensing fan drive shall be installed.

3.12 FRAME:

Steel channel, 110,000 PSI minimum. 16.0 cubic inch Section Modulus minimum.

- 3.13 WHEELS:** Seven each (7), ventilated, hub piloted, 10 hole, for flange nut installation steel disc wheels shall be provided for each chassis. Rim size for the single fronts, dual rears, and a spare wheel shall be as required for GVWR of vehicle supplied, minimum 22.5 X 8.25. All wheels shall be interchangeable with each other. The wheel type and size must assure proper overall and compatible front and rear tread width. Both sides of all wheels shall be painted body color.
- 3.14 TIRES:** Seven each (7) non-directional heavy duty truck and bus, single front, dual rears and a spare tire shall be provided for each chassis. Tires shall be sized as required for the GVWR of the vehicle supplied and at least 11R22.5 - load range "H". The tread design on the chassis shall be matching M&S rated traction tread front and rear. The spare tire must be same brand and tread design and shall be shipped loose with the completed fire apparatus.
- 3.15 FUEL TANK & FILLER:** A certified steel fuel tank shall be supplied and frame mounted for a total of 65 usable gallons (minimum). Tank design shall not interfere with specified angle of departure, or servicing of rear axle components. The fuel filtration equipment shall meet the engine manufacturer's requirements.

The fuel tank shall be equipped with filler tube, sealed fuel tank cap with retainer and vent fitting. The vent line shall allow 8 degree side hill operation of the apparatus without spilling fuel on the ground. The fuel tank filler tube shall be designed in such a way as to prevent fuel from spilling down exterior of apparatus during filling. Any chassis fuel system modifications shall be fully compliant with the California Air Resources Board (CARB) standards.

NOTE: All fuel tanks will be labeled with a "**DIESEL ONLY**" label. The type of label and mounting locations shall be determined at the pre-construction conference.

- 3.16 EXHAUST SYSTEM:** Depending on the chassis supplied, the OEM muffler(s), tail pipe(s), and header pipe(s) may require replacement, relocation and/or modification. The tail pipe(s) and muffler(s) shall be mounted in a fashion as to provide as much ground clearance as possible (no lower than specified by the OEM) and be routed over the rear axle housing terminating at the left or right rear corner of the body. (To be discussed at the pre-construction conference)

NOTE: Any modifications to the exhaust system must be OEM chassis manufacturer approved and in no way shall void any OEM chassis manufacturer warranties.

The exhaust outlet shall not terminate near the storage compartments. Care must be exercised to protect such items as fuel line speedometer cable, electrical wiring, remote control cables, brake hoses, compartment floors, batteries, fuel tanks, gear boxes and starter motors from high exhaust system heat created when the fire engine is in a stationary pumping mode. To accomplish this purpose, heat shielding and or baffles shall be added as needed.

SECTION 4 - FIRE PUMPS

- 4.1 MIDSHP PUMP:** The contractor shall provide and install a 1250 gallon per minute, fire service rated, double suction, single-stage, midship mounted centrifugal class "A" rated fire pump that provides water pressure to all discharges in accordance with NFPA Standard 1901. The pump impeller shall be bronze, mounted on a stainless steel impeller shaft and fitted with a mechanical seal. It shall be designed so repairs can be made by replacement of normal repair parts (e.g. seals, bearings, impeller and wear rings).

ACCEPTABLE BRANDS: Darley LDM or PSM 1250; Waterous CSY-1250 Series; Hale Q Flo 1250.

The contractor shall install on the apparatus, all gauges, plumbing, suction and discharge valves, pressure governor, primer pump, unions, hose fittings, and pump controls necessary to make the entire fire pump operational and tested in full compliance with NFPA # 1901, latest editions.

- 4.2 MIDSHP PUMP DRIVE:** The pump transmission shall be engaged by a guarded toggle switch that locks in the road or pump mode. The pump shift controls shall be located in the cab within easy reach of the operator and shall include indicator lights as mandated by NFPA # 1901 latest editions.

The midship pump shall be mounted in a manner that the vehicle drive-line angles shall not exceed the O.E.M. recommended working angles for the universal joints. All drive-lines and U-joints used for attachment to the midship pump shall be equal in size and quality to the O.E.M. drive-line components. All modified drive-lines shall be both statically and dynamically balanced.

The midship pump shall operate free from pulsation and vibration under all operating conditions with the automatic transmission.

Pump shift shall be air operated and shall incorporate a standard fire apparatus shifting mechanism for ease of maintenance and parts availability. The pump shift switch shall be mounted in the cab and identified as **PUMP SHIFT** and include shift instructions permanently inscribed on the **PUMP SHIFT** switch plate.

The air pump shift assembly shall include an indicating light system which will advise the operator when the shift into **PUMP** has been completed. The switch that controls the lights must be mounted on the pump transmission and positioned so that the pump shift arm activates the switch only when the shift arm has completed its full travel into **PUMP** position.

Pump shall be equipped with a thermal relief valve that operates in such a way as to prevent pump overheating.

- 4.3 PRIMING PUMP:** Priming pump shall be a 12-volt, solenoid operated, positive displacement rotary vane pump capable of producing suction lifts of 20- to 30 feet. (Hale

ESP Primer Pump or equal). The pump control shall be located on the pump operator's control panel.

- 4.4 PUMP COOLER:** A ½" line shall be plumbed from the discharge side of the main pump to the water tank to help keep the pump cool when water is not being discharged. This line will be designed to by-pass water when the by-pass valve is open and to maintain the pump water temperature at a safe level. The by-pass cooler valve (Class 1 or equal) shall be located on the left pump operator's panel.
- 4.5 ANODES:** Easily replaceable sacrificial catalytic action ¾" magnesium anodes shall be installed to protect the pump and plumbing manifolds.
- 4.6 GAUGES, RATING AND TESTING**
Contractor to provide a metal I.D. plate describing the actual test capacity and pressure. Plate shall be mounted on pump panel. Water tank level gauge shall be mounted on front bulkhead of left high side compartment so as to be visible to the operator from the left side view mirror.

SECTION 5 - PUMP CONTROLS

5.1 MIDSHIP PUMP CONTROL PANEL - UPPER SECTION:

Pump operators panel will be located on left side of apparatus body. Both right and left pump panels will be well lighted with a control switch located on each panel.

The following gauges and controls shall be provided on a large hinged panel of 14 gauge brushed stainless steel:

- Pump engaged light.
- A Class One ENFO III gauge, or equivalent, displaying engine RPM, voltage, water temperature, oil pressure and engine hours.
- Both water temperature and oil pressure shall have a red warning light and buzzer.

In addition, the following controls shall be provided on the operator's panel:

- Ten (10) 2 1/2" face, line gauges, one for each 1-1/2", 2-1/2", and 3" discharge outlet, and the foam manifold. Gauges shall be installed over the corresponding valve control.
- A Felsted (or equal) engine throttle control.
- Relief valve controls and lights.
- All discharge and suction valve controls.
- Any additional gauges, instruments or controls required for the operation of this apparatus.

All gauges and controls shall identified by color coded engraved marker plates. Color coding to be per NFPA 1901 –Table A.16.9.1. All discharges capable of providing foam shall be marked "Foam" by engraved marker plates.

An air line outlet with a 3/8" female quick change coupling shall be provided on the pump panel for attachment of an air hose. (for air tools, blowing dust off engine, filling tires, etc.)

A recessed 5 1/2" wide (ID) X 6" high by 26" long tray with nylon straps with "J" hooks and Footman Loops shall be mounted in running board in front of pump panel and on opposite side for 3" soft suction hoses.

5.2 MIDSHIP PUMP PANEL - LOWER SECTION:

Three (3) 2-1/2" outlets shall be provided, two on left pump panel, one on right pump panel, One 4" LDH discharge right side of panel, One (1) 1-1/2" discharge right side pump panel. Two (2) 2-1/2" gated suction inlets shall be provided, one at each pump panel. Two (2) 6" steamer suction inlets one on each side.

In addition, the following controls shall be provided on the lower section:

1. Indirect cooler control valve
2. Pump bypass line control valve
3. Test ports-Vacuum/Pressure connections for testing the water pump.
4. RPM counter connection
5. Primer control and selector valve

SECTION 6 - VALVES AND PLUMBING

6.1 DISCHARGE, INLINE VALVES:

All discharges shall be provided with fire service full flow, quarter turn ball valves with National Hose Standard Threads (NHT). All valves shall be the "Drop-Out " body design. All valves shall have stainless steel balls.

All valves shall be controlled from pump operator's panel unless otherwise noted.

All discharge valves shall be located behind pump panels with their discharge ports extending through the panel, furnished with the "Torque Lock" locking feature (Akron 8800 series) and terminate with a 30 degree down spout.

All king nipples shall be stainless steel.

All inline valves shall be provided with a "Torque-Lock" locking system. All the valves shall be Akron 8800 Series "Torque Lock" valves that swing out for servicing or replacement. The valves shall be controlled by a Remote Control Unit that locks in any position (Akron 8800 Series). The remote control linkage between the valve handle and control unit shall be manufactured of 1/2" diameter stainless steel rod with 1/2"-20 NF threads cut on the ends. The rods shall be attached using cadmium plated rod end ball joint assemblies.

6.2 DISCHARGE VALVE LOCATIONS:

One 3" in-line valve with a slow close feature shall be provided for the monitor stand pipe. (See monitor)

Two 2-1/2" Discharge valve shall be located behind the left pump panel.

One 4" LDH discharge valve shall be located behind right pump panel.

One 2-1/2" Discharge valves shall be located behind the right pump panel.

One 2-1/2" in-line valve shall be located behind the left pump panel and control the 2-1/2" discharge at rear of the hose bed, right side.

One 2" in-line valve shall be located behind the left pump panel and control the 1-1/2" discharge at rear of hose bed, left side.

One 2" in-line valve and piping shall be provided for 1-1/2" cross-lay hose bed.

One 2-1/2" in-line valve and piping shall be provided for 2-1/2" cross-lay hose bed.

Mattydale type swivels shall be provided allowing hose to be pulled in either direction. Hose connections shall be 1-1/2" male NHT

One 1-1/2" in-line valve shall be provided for a tank fill line.

6.3 SUCTION VALVES:

All suction valves shall be provided with fire service full flow, quarter turn ball valves with National Hose Standard Threads (NHT). All valves shall be the "Drop-Out " body design. All valves shall have stainless steel balls. ***The supplier may substitute a 4-***

1/2" butterfly suction valve in lieu of the specified 4-1/2" ball suction valve located at the front bumper as long as the valve will operate from the pump panel and is out of sight.

All valves shall be controlled from pump operator's panel unless otherwise noted.

All suction valves located behind pump panels with their inlet ports extending through the panel shall be furnished with the "Torque Lock" locking feature and shall be supplied with female swivel fitting, strainer screen and chrome male plug.

All inline valves shall be Akron 8800 Series "Torque Lock" valves that swing out for servicing or replacement. The remote control linkage between the valve handle and control unit shall be manufactured of 1/2" diameter stainless steel rod with 1/2"-20 NF threads cut on the ends. The rods shall be attached using cadmium plated rod end ball joint assemblies.

6.4 SUCTION VALVE LOCATIONS

One 3" in-line suction valve shall be installed in the tank to pump line and shall be pneumatic.

One 2-1/2" apparatus suction valve shall be located behind the left pump panel.

One 2-1/2" apparatus suction valve shall be located behind the right pump panel.

One 4-1/2" suction valve front bumper right side. ***Thread shall be 4-1/2" NHT with a 5" stortz adapter and cap. The front intake shall terminate above the front bumper.***

6.5 DECK MONITOR PLUMBING:

One (1) 3" Discharge shall be provided for a deck monitor, centered above midship pump, on right side. A 3/4" drain shall be provided for this outlet. Control valve to be appropriate Akron Brass "slow-open" valve. Deck monitor shall be an Akron Brass Apollo with an Akron Brass Turbomaster 500, 750, 1000, 1250 gpm master stream combination nozzle and Quad Stacked Tips mounted, and ground base with a 2 1/2" siamese. A 3" Akron Brass direct mount base shall be installed on the 3' discharge. Deck monitor plumbing will be tall enough to allow 360 degree operation of monitor without any obstruction, but low enough so that the monitor in the stowed position is not higher than the light bar.

6.6 PRESSURE RELIEF/SUCTION PROTECTION VALVE:

(Valve shall be of same manufacture as midship pump)

A relief/suction protection valve shall be provided in the midship plumbing. It shall have an on-off control and be capable of being set while the pump is operating. With the pump operating from draft, delivering its rated capacity at 150 PSI, if pump discharge lines are shut-off, the increase in discharge pressure shall not exceed 30 PSI. Valve and controls shall meet NFPA #1901.

Colored indicator lamps shall visually indicate when the valve is open or closed.

The discharge outlet for the suction relief valve shall be directed away from the pump operator's position and discharge to the ground. A chrome NHT male connector shall be provided on the end of the discharge tube. A label shall be installed in the area of the connector warning against capping it.

6.7 DRAIN VALVES:

A panel mounted master drain valve shall be provided. The valve shall be designed so that when opened, water in all plumbing and the pump housing, shall drain. Additional drains may be required to ensure that the entire system can be drained.

3/4" Quarter Turn Ball Style Drain Valves shall be provided for all pump panel discharges, suctions and common discharge manifolds. A drain valve shall also be provided at the front bumper for the truck protection line.

All drain valve discharges shall be routed to the bottom of the apparatus body through 3/4" I.D. neoprene hose and dumped directly onto ground.

6.8 PLUMBING SYSTEM - MIDSHIP PUMP

All 2" and larger piping shall be galvanized iron schedule 40 pipe with victaulic couplings used to facilitate repairs and reduce torsional stress in plumbing system. Plumbing system shall be capable of providing full flow to all discharge points including the front bumper discharge. 2" and smaller piping may be Aeroquip hose with threaded connections, rated at 600 PSI minimum working pressure.

Class 1 Flex with Stainless Steel Victaulic Couplings also acceptable.

All 2-1/2" discharge outlets and suction inlets will be provided with 3/4" drains.

One (1) 1/2" pump to tank by-pass line shall be provided with a 1/4 turn control valve mounted on operator's panel. (Pump cooling line).

Tank Suction line shall measure 3" I.D. with a bronze clapper type check valve installed between the pump and the 3" full flow valve. This line shall be flexible enough to allow for chassis twisting and flexing.

6.9 HEAT EXCHANGER (Indirect Cooler) - MAIN ENGINE:

In addition to the chassis manufacturer's standard cooling system, an engine heat exchanger shall be included in the engine's cooling system. The heat exchanger shall be of brass construction with cooling lines and valves of non-ferrous metal. Cold water from the discharge side of the pump shall circulate through the exchanger and returned to the suction side of the pump. The antifreeze coolant solution used in the engine cooling system shall not be diluted or lost during the process. Water flow from the pump to the heat exchanger shall be controlled by a 1/2", 1/4 turn valve located on the midship pump panel.

SECTION 7 - FOAM SYSTEM

A FoamPro Model 2002 Foam system shall be provided. The system shall be installed following the foam system manufacture's instructions without exception.

The foam system operating controls shall be located in the pump panel. Controls shall be clearly labeled.

The system shall be capable of delivering foam solution to all 1-1/2" discharges and all 2-1/2" discharges.

The system shall include one of each of the following: Flow Meter; Run/Standby switch; Foam tank "EMPTY" indicator; Foam tank "empty" float switch; 12 volt, solenoid operated supply shut-off valve; Line strainer; 2 way combination, Calibrate Valve/drain valve; Manual 1/2" drain valve installed in the tank sump. The system shall have an Integrated "Auto-Start" option.

All metallic plumbing connectors used in the foam system shall be manufactured from brass or stainless steel. (NO EXCEPTIONS)

A valved drain shall be provided at the lowest point of the concentrate storage tank. The drain shall be piped to drain directly beneath the apparatus without contacting any part of the apparatus or components.

A strainer shall be provided in the foam concentrate supply line between the foam concentrate tank and the foam proportioner or the foam pump.

The system shall be plumbed to allow the water tank filler line to be ahead of the foam injection port. A full flow, high pressure 400 PSI check valve shall be installed ahead of the injection port, mounted in any position to automatically prevent foam solution from flowing backwards to water pump or booster tank. A discharge manifold shall be designed and all foam discharges shall be connected to it. A 3/4" drain shall be provided to drain this manifold.

"AMP" CP (Circular Plastic) screw together electrical couplings shall be installed in all wiring harness that are spliced or cut. Crimped butt connectors are not acceptable.

A full flow check valve shall be provided to automatically prevent water from back flowing from the foam proportioner to the foam concentrate storage tank.

SECTION 8-TANKS

8.1 WATER TANK - 750 GALLONS - POLYPROPYLENE:

Capacity shall be a minimum of 750 gallons, usable water, considering all applicable weight standards. The tank shall be completely removable from the body without cutting or bending any components. Tank shall be constructed of POLYPROPYLENE.

Tank sump shall have anti-swirl baffles and extend down from the center of the tank. Tank suction line shall extend from center of slump forward directly into pump. The sump shall be as close to the center of the water tank as possible.

Tank baffles are to be constructed of same material as the tank.

The sump shall be provided with a minimum 2" diameter removable drain plug for clean out purposes.

The tank shall have a combination fill and overflow tower. Overflow shall discharge to the rear of the apparatus. The fill tower shall be provided with a removable screen and hinged cover. If the fill tower is bolted to the top of the tank, stainless steel bolts and nuts must be used.

Unit shall be delivered with a full tank of water.

8.2 LADDER BED:

Ladders will be stowed in a flat rack in a tunnel that penetrates the water tank. The tunnel shall accommodate a two section 24' extension ladder, 14 ft. roof ladder, 10 ft. collapsible attic ladder, spine board, 6' & 8' pike pole. If ladder bed is not enclosed, protection shall be provided on the underside of the ladder bed to prevent road grime build up.

8.3 FOAM TANK (SEE FOAM SYSTEM):

A Foam Concentrate Tank with a twenty gallon capacity shall be provided as an integral cell in the right front of the water tank. A 6" diameter filler shall be provided in a fill tower on the right forward top of the water tank. A strainer shall be provided. Access to the tower shall be through a hinged lid in the hose bed cover. Two percent of the tank capacity shall be designed as "unfillable" to allow for liquid expansion.

The filler shall be equipped with a positive sealing cap.

A pressure vacuum vent shall be installed in tank.

8.4 FOAM CONCENTRATE TRANSFER SYSTEM:

An FT 500 Foam Concentrate Transfer System, or equivalent, shall be provided for refilling foam concentrate tank from the ground. It shall have a 3.5 gpm capacity, with an 8' lift. A 5' quick connect suction hose shall be provided, with a foam fill coupling on the left, lower surface of the pump panel. An automatic, tank fill shutoff, pilot light power indicator, 12 volt thermally protected motor, and a 15 amp circuit breaker shall be provided. Pump shaft shall be stainless steel.

8.5 LIQUID LEVEL GAUGE:

A Class One ITL Led Water Tank Level Indicator shall be provided. The level indicator shall be installed on the front bulkhead of the left high side compartment.

SECTION 9 - APPARATUS BODY

9.1 APPARATUS BODY CONSTRUCTION:

The apparatus body shall be constructed from steel, stainless steel, or aluminum or equivalent. The body design may require additional features such as gusset plates where body structure members meet at 90 degree angles, non-rigid mounting of body to frame, independent pump panel mounting or other features that will enhance the operation and life of the apparatus.

The choice of construction material shall be that of the contractor except where specifically stated. Any failure of the body due to inadequate construction material and/or design shall be the sole liability of the contractor.

9.2 COMPARTMENTS, GENERAL CONSTRUCTION:

All closed compartments shall be water tight and vented to the outside. Upper compartment shall not vent into the hose bed.

All compartment floors shall be designed to be swept out.

All compartment floors shall be provided with black "Turtle Tile" (or equal) modular cushion tiles. Long handled tool drawer-type tray in cross body compartment (See Section 9.4) shall also be lined with black "Turtle Tile" (or equal). Drawer-type tray in left side forward compartment (See Section 9.5) shall be lined with 1/8" black rubber.

All compartment doors shall be equipped with aluminum rollup doors with frames of natural aluminum.

Shelving shall be manufactured of 1/8" aluminum with a 2" edge broken up 90 degrees on all sides. The shelf finish shall be unpainted aluminum. On any shelf longer than 36" a 2-1/2" x 1" strong back shall be provided along the center, bottom of the shelf.

Compartment walls shall be painted with white or gray spatter "Zolotone" type (or equal) low maintenance paint. If body is constructed from stainless steel or aluminum, compartment walls can be left natural.

Minimum capacity rating for compartments shall be 500 lbs.

9.3 COMPARTMENT SIZE AND LOCATION:

Minimum usable compartment space shall be not less than 128 cubic feet.

Each compartment shall be equipped with door switch activated lights.

A 2" diameter "Amber" Door Open Warning light with buzzer shall be installed on cab instrument panel, easily visible to driver.

The tops of all upper side compartments shall be fitted with bright finish aluminum tread plate, broke down to direct water away from the tops of the upper compartment doors.

Formed drip moldings shall be installed over all remaining compartment doors located on the outside of the body.

All compartment doors shall have a lock, all keyed the same.

The following compartments shall be provided. Sizes listed are minimum dimensions and shall be met with the door closed. Tolerances shall be plus or minus 1 inch.

9.4 CROSS BODY COMPARTMENT:

A through compartment shall be provided behind the cab and ahead of the mid ship pump with access door on each side. Compartment shall be 21" wide x 31" high x 88" deep (+2 inches for each dimension). These dimensions are to be considered minimum. The compartment shall run the full width of the apparatus. It shall be equipped with an adjustable shelf. The doors on this compartment shall extend from just above the running boards to the top of the compartment. The compartment area obstructed by the frame rails shall be boxed in with the floor of the through area forming the top. This isolated inner compartment shall be 21" wide x 14" x 27" deep (+2 inches for each dimension). A 1/8" aluminum tread plate drawer-type tray with 7" sides, 13" wide, and 75.5" long (+2 inches for each dimension), to accommodate long handled tools shall be installed in this compartment. The tray shall move on roller glides and come out each side approximately half way with stops.

The rear wall shall have a removable access panel to allow entry into the pump compartment. The size of the opening shall be as large as possible, but no less than 28" square (minimum).

9.5 LEFT SIDE FORWARD COMPARTMENT:

This compartment shall be provided with dimensions of 30" wide x 63" high x 24" deep (+2 inches for each dimension).

A 1/8" aluminum (not tread plate) drawer-type tray with 3" sides shall be installed in this compartment. The tray shall move on roller glides (Ref: Grant 4930-18) and stops to prevent it from coming all the way out and a gas shock to hold it securely when it is pushed in.

9.6 LEFT SIDE REAR COMPARTMENT:

This compartment shall be provided with dimensions of 38" wide x 61" high x 24" deep (+2 inches for each dimension).

The compartment shall be furnished with a slide out tray for mounting an agency supplied generator. The tray shall be mounted on roller guides (Ref: Grant 4930-18"). The tray shall lock in both the stored and extended positions by means of a gas shock. A quick disconnect clamping device shall be installed in the tray that will lock to the generator frame.

9.7 HIGH SIDE COMPARTMENT - LEFT SIDE:

This compartment shall be provided over the wheel well with dimensions of 52" wide x 33" high x 12" deep (+2 inches for each dimension). For desired configuration with a

T Tank, the upper compartment shall be a minimum of **12" (± 2 inches for each dimension)** deep. One shelf shall be mounted in this compartment.

9.8 REAR COMPARTMENT:

This compartment shall be provided ahead of tailboard with dimensions of 52" wide x 26" high and 21.75" deep (**± 2 inches for each dimension**). The bottom of this compartment shall be provided with a full width and depth slide out tray mounted on roller guides. Tray shall have 3' sides and be constructed of aluminum treadplate.

9.9 RIGHT SIDE FORWARD COMPARTMENT:

This compartment shall mirror the compartment on the left side, with exception of no slide out tray.

9.10 RIGHT SIDE REAR COMPARTMENT:

This compartment shall mirror the compartment on the left side, with the exception of having no slide out tray. Bracket for agency supplied Waterous Floto-Pump is to be mounted on the bottom of this compartment.

9.11 HIGH SIDE COMPARTMENT - RIGHT SIDE:

This compartment shall mirror the compartment on the left side.

9.12 AIR BOTTLE (S.C.B.A.) COMPARTMENTS:

Four (4) Single Air Cylinder (S.C.B.A.) storage compartments will be provided, in rear wheel well areas. Compartments shall be constructed of aluminum or polypropylene tubing with cast aluminum doors and frames (Ref: Cast Products Model RFT41753). Rubber matting shall be installed in bottom of compartments to prevent movement of air cylinders. Compartments shall be designed in such a way as to prevent the cylinders from falling out, should the door open accidentally.

9.13 COMPARTMENT DOOR CONSTRUCTION:

All compartment doors, with the exception of the rear compartment, shall be Robinson Roll-O-Matic, Dover aluminum roll-up doors or equivalent. The rear compartment doors shall be standard opening panel doors, with outside skin to be aluminum treadplate.

9.14 FRONT TOW HOOKS:

Two (2) heavy duty steel tow hooks shall be provided, bolted directly to frame rails. Exact location to be determined at the pre-construction conference.

9.15 REAR TOW EYE:

A 3" diameter tow eye shall be provided and mounted to the frame rail. Exact location to be determined at the pre-construction conference.

9.16 MAIN HOSE BED:

The hose bed shall be approximately 72" wide x 112" deep x 20" high (**± 2 inches for each dimension**) and accommodate a minimum of 600' of agency supplied 5" large diameter hose, 750' of agency supplied 3" hose and 150' of agency supplied 1-3/4" hose.

The interior of the hose bed shall be free of projections such as nuts, sharp edges, or brackets that may damage hose. The hose bed and walls shall be manufactured from 1/8", aluminum sheet, orbital sanded and left unpainted.

A stainless steel angle molding shall be installed over the rear opening of the hose bed to protect the body from wear.

Hose bed deck shall be fitted with extruded aluminum slatted floor boards, removable for tank access.

Four (4) adjustable hose bed dividers shall be provided. One divider to be equipped with a full length hinged shelf with an angle stop on the adjacent divider. Location of shelf to be halfway up divider. Purpose of shelf is to provide space for specialized hose packs. A fastener shall be provided to hold shelf in the up position while lower tray is loaded.

Aluminum strut (Ref: Globe Part Number G-1315-AL or equal) shall be inset into the floor, across the rear of the hose bed, to provide a adjustable mounting point for the divider. A similar strut shall be mounted against the forward wall of the hose bed for divider attachment. Hose bed dividers shall be manufactured from 1/4" marine grade aluminum skip welded to an extruded aluminum T-base.

9.17 HOSE BED COVERS:

Aluminum tread plate hose bed covers hinged to the outside shall be manufactured and installed. The covers shall be provided with a stainless steel positive latching device at the front of each corner to hold covers in the open position. A hinged access door is to be provided for access to the tank and foam concentrate fill towers.

A switch shall be provided so that hose bed lights turn off automatically when hose bed covers are in the closed position.

Exterior surface shall meet NFPA 1901 (Latest edition) slip resistance per 15-7.3

Handles shall be installed for lifting, front and rear.

Each aluminum cover shall be fitted with red vinyl end skirts with three (3) straps, and quick release thumb spring buckles. Astrup # 207668 cadmium plated buckles (or equal) and nylon tie down straps shall be attached to the end skirts. The use of rubber coated hooks and stainless steel footman loops will secure the end skirts/bed covers to the main body.

The tailboard side of hose beds must not be obstructed.

9.18 TRANSVERSE HOSE BED:

Two (2) transverse hose compartments will be provided at front of body, one to accommodate 150' of agency supplied 1-3/4" fire hose. One to accommodate 150' of agency supplied 2-1/2" fire hose.

These compartments shall be fitted with a single 3/16" aluminum tread plate cover, hinged along leading edge. Aluminum slatted decking shall be installed in compartment

bottoms. Covers shall be equipped with flaps (see hose bed.) Rollers on outside of edges of transverse bed for pulling hose forward or to the rear shall be provided.

9.19 FENDERS:

1/8" polished stainless steel fenders shall be provided on each side of the apparatus. The fender shall be 1-1/4" wide with a 1" lip. The rear quarter panel shall be circle cut to the radius of the fender. An inner wheel well liner shall be provided with the fender attached using stainless steel screws. The fender, wheel well liner, and quarter panel shall be assembled together to form a single wheel well unit.

A minimum of 6" of clearance between the tire and liner shall be provided for snow chain installation and operation.

9.20 TAILBOARD:

The tailboard shall be constructed of structural tubing overlaid with 1/8" aluminum plate. The tailboard substructure shall have a minimum of four structural tubing cross members. The tailboard shall be completely modular in design and replaceable in the event of a collision. The tailboard surface shall be non-skid that meets both California and Federal OSHA standards.

The tailboard shall be 12" deep. Three (3) spring loaded marker lights shall be installed in the center rear of tailboard.

An 8" deep intermediate step shall be located directly above the rear compartment and below the ladder tunnel. This step shall be full width of tailboard.

The body area surrounding the tailboard shall be 1/8" aluminum tread plate.

A tailboard to cab buzzer system with protected button shall be provided. The button shall be mounted on the left side rear compartment.

Interface Brackets - Two (2) 26" extruded aluminum handrail sections shall be provided, with matching sockets built onto the rear bulkheads of the compartments. Brackets shall be held in the sockets by plow pins. The purpose of these is to be able to mount them in the horizontal position and lace hose between them when moving from house to house during structure protection operations.

9.21 RUNNING BOARDS:

Running boards shall be constructed from 3/16" aluminum plate bolted to sub frame outriggers and spaced no less than 3/8" from body. All running boards shall be broken down three (3) inches and back 1" for added strength. Running board surface shall be non-skid that meets both California and Federal OSHA standards.

9.22 RUB RAILS:

Extruded metal rub rails shall be provided and attached to the body sides. The rub rails shall extend out beyond the running boards and tailboard. The rub rails shall extend beyond the body a minimum of 1-1/2". The rub rails shall be attached using stainless steel fillister head cap screws.

9.23 HANDRAILS:

Handrails shall comply with NFPA 1901 (Latest edition) standards, and shall be located as follows:

Handrails shall be aluminum extrusion. A set of handrails shall be furnished one on each side of the rear body.

A handrail shall be provided over both the left and right pump panel and below the top of the body.

A handrail shall be provided below the hose bed and above the rear compartment, the width of the hose bed.

One each handrail on each hose bed cover located at the rear edge of each cover.

Access handrails shall be provided at all entrances to the cab.

Exact location of handrails will be determined at the pre-construction conference.

9.24 STEPS:

All steps shall comply with NFPA 1901 standards. (Latest edition)

A swing down step shall be provided below tailboard if ground to tailboard distance exceeds 24". Step to conform to NFPA 1901, 15-7.1, Latest Edition.

Six fold up steps shall be provided. Exact location will be determined at the pre-construction conference.

Steps, platforms or secure ladders shall be provided so fire fighters have access to all working and storage areas of the apparatus. All steps shall meet both California and Federal OSHA standards.

9.25 BODY TRIM:

Where practical, commercially available body trim components shall be used.

Trim plates shall be installed around pump panel discharges, suction inlets and control handles.

9.26 SUCTION HOSE STORAGE:

Storage shall be provided for two (2) 10-foot lengths of 6" diameter, light weight "Kochek" suction hose with long handle couplings. The storage bed shall be installed one each over the left and right high side compartments. Adjustable nylon straps with "J" hooks and Footman loops shall be provided to secure suctions. **Spring hold downs will also be acceptable.**

Suction hose trays shall be constructed of polished aluminum.

9.27 PIKE POLE STORAGE:

Suitable storage tubes for two pike poles (1 - 6 ft. and 1 - 8 ft) shall be provided in ladder tunnel.

9.28 PUMP COMPARTMENT:

The right and left side pump panels shall be easily removable for access to the midship pump. Removable panels to be constructed of brushed stainless steel. Suitable bracing shall be provided behind the panels to keep the panels from flexing and vibrating.

The top of the midship pump compartment shall be removable.

The top of the midship compartment shall be aluminum diamond plate that meets CALOSHA and Federal OSHA nonslip requirements.

SECTION 10 – LIGHTS & ELECTRICAL SYSTEMS

10.1 GROUNDING SYSTEM:

The apparatus shall be equipped with a heavy duty 12 volt negative ground system.

10.2 ELECTRICAL SYSTEM INTERFACE PANEL:

All body wiring shall be separate and distinct from the chassis wiring. All warning lamps, compartment lights, work lights and other accessories shall be powered from 12 volt relays (Bosch 12V, 20/30A, P/N0 332 204 150). All panel switches shall only control the relays.

An interface panel shall be provided and mounted within the fire body at a convenient, easy to reach location. The purpose of this panel is to facilitate repairs to the fire body electrical wiring and isolate the body wiring from the chassis.

All terminals on this panel shall be properly labeled and numbered with permanent, moisture and heat resistant material. The labels must agree with wiring schematic supplied with the apparatus.

All body wiring shall be 14 gauge or larger, properly sized for the circuit load and length to minimize voltage drop. All conductors shall be color coded, no color can be repeated within a loom.

All circuits shall be divided and balanced with junction blocks for proper load distribution.

Wherever possible, wiring shall be routed in loom as a single harness. Heat resistant convoluted loom shall be used. All wiring harnesses shall be supported by metal brackets attached to the body subframe. Plastic clip on type holders are not permissible.

Only solderless, insulated, crimp automotive electrical connectors shall be used.

All body electrical shall conform to NFPA #1901, (Latest edition) standards.

10.3 ELECTRONIC LOAD MANAGEMENT: A Kussmaul Electrical Load Manager model # 091-86-1901 or equal shall be installed if necessary, that will monitor and control the electrical loads and utilize a priority shutdown when the 12 volt electrical system is overloaded. The system shall include a flashing warning light that will indicate a low voltage or battery discharge condition. The load manager shall only monitor the vehicle's voltage while the transmission is in neutral and the parking brake has been applied. The system shall also sequentially re-energize the electrical systems as voltage recovers.

The electrical system shut down priority shut down priority shall be as follows:

- Air Conditioning
- Upper zone emergency lights
- Compartment lights
- Work lights

10.4 LIGHTS, SIGNALS AND CONTROLS:

A circuit breaker panel shall be located in the apparatus cab protected with a removable aluminum cover. All circuit breakers shall be automatic reset.

Storage compartment lights shall be controlled by a Master Switch located on the dash board with indicator lights located in cab and on the pump panel.

A 2" diameter flashing amber "Open Door" warning light with buzzer shall be installed on cab instrument panel visible to driver. This light and the buzzer shall activate only when the apparatus is in gear and the parking brake is released. This warning shall activate for both compartment doors and cab/crew doors.

Six (6) ground illuminating lights shall be provided. Two on each side under cab doors, activated when doors open, and two under rear tailboard controlled from the cab.

Pump operator's panel shall be furnished with three (3) Weldon #3-2025 lamps (or equal) under a stainless shield/hood for night illumination. The lights shall be controlled from the pump panel switch.

The right side pump panel shall be furnished with two (2) flush mounted clear lights, one on each side, mounted in both forward and rear facing bulkheads of compartments surrounding pump panel. Lights to be controlled from switch on pump operator's panel.

Surface mounted area work lamps (Ref: Weldon 3-2020 Halogen Clear Light) shall be provided one (1) on each side of cab, one (1) right side, rear, facing sideways, one (1) left side, rear, facing sideways and two (2) rear, to the rear of the body. These lights shall be furnished mounted with a 14 degree downward tilt (Ref: Cast Products Incorporated Housing for Weldon 2020 Series). The lights shall be controlled from the cab.

All steps, running boards and walking surfaces shall be adequately lighted and controlled from the cab.

Two (2) engine compartment lights activated by automatic switches at the removable engine cover.

Two (2) pump compartment lights with switches shall be provided. (Ref: Weldon #2-2025)

Two (2) hose bed lights with switches shall be provided (Ref: Weldon #2-2025)

The locations of these lamps will be determined at the pre-construction conference.

Signal-Stat #3613W flush mount chrome compartment lights, or equivalent, shall be provided in the following compartments:

Three (3) lights shall be furnished in rear compartment.

Four (4) lights shall be furnished in the rear wall of the cross body compartment.

Two (2) lights shall be furnished in all other compartments.

10.5 BATTERY CHARGING SYSTEM:

The apparatus shall be equipped with an on board battery charger, the location shall be determined at pre-construction meeting. (Ref: Kussmaul "Auto Charge")

A battery charger outlet will be provided and wired to the common post of the battery disconnect switch. The outlet will be a dual function outlet, providing current to the battery charger and block heater. A 20 amp three prong male or equivalent outlet shall be mounted on the left side of the apparatus near driver's door. This outlet shall be an "Automatic eject" type (Kussmaul #091-20WP-120), No Exception.

10.6 D.O.T. AND SUPPLEMENTAL LIGHTING:

All marker lights and reflectors required to comply with Federal and California Vehicle Code Regulations.

10.7 TAIL LAMP ASSEMBLY:

Cast Products Incorporated RCO4000 (or equal) cast aluminum triple light trim assembly with one (1) Weldon Series RED 2010 (or equal) stop and tail light; one (1) Weldon Series 2000 (or equal) AMBER directional arrow light; one (1) Weldon Series 2020 (or equal) CLEAR white backup light shall be mounted on the back of the apparatus.

The directional light function shall be isolated from the stop light circuit and wired to the directional arrow lamps.

10.8 CLEARANCE LAMPS:

Truck Light 19200A (or equal) clearance marker lamps with chrome guards shall be provided as required.

One (1) each Truck Light 19200R(or equal) shall be mounted on the left and right rear stanchions.

Amber arrow type (Ref. Guide R8-53) front mounted directional signals shall be provided.

10.9 DRIVING/FOG LIGHTS

Per-Lux Model 600R Stainless Steel halogen driving lights with louvers shall be mounted under front bumper. Lights shall be controlled from cab switch panel.

10.10 EXTENDING SCENE LIGHTS:

Two (2) each telescoping poles with through deck mounting casting and clamping brackets shall be provided and mounted at an appropriate location over the pump compartment; one to the right and one to the left. Exact locations shall be determined at the pre-construction conference. These lights shall illuminate a work area located to the right, left or rear of the apparatus. Lamp extension poles shall have a 12 volt "lamp up" indicator switch and wired to warning lamp monitor located both in the cab and at the pump panel. On/off switch shall be on each lamp head.

Each light shall be wired to a circuit breaker. Lamp head shall be low profile, focused, 12-volt, 300 watt.

10.11 ILLUMINATION FOR DECK GUN AREA:

Surface mounted area work lamps (Ref: Weldon 3-2020 Halogen Clear Light) shall be provided and mounted at an appropriate location in the deck gun area.

SECTION 11 - EMERGENCY LIGHTS

11.1 LIGHT SWITCHES

Emergency lighting system shall be controlled by rocker switches in the overhead. Control switch for directional arrow bar shall be co-located with siren control head.

11.2 ELECTRONIC SIREN:

A Federal Signal EQ2B electronic Q siren shall be provided, with a control head mounted centrally on the doghouse. A remote amplifier shall be mounted in the cab. A Federal Signal BP200-Q 200-watt speaker with a Q-style siren grill shall be provided and installed in the right side bumper. In addition a Q2B Electro-Mechanical Siren shall be mounted on front bumper, location to be determined at the pre-construction meeting. Foot buttons which operate the siren shall be located on each side of floor of cab.

11.3 EMERGENCY LIGHTING:

An NFPA # 1901 (latest edition) compliant emergency lighting package shall be provided. All emergency lights, strobes, flashers, shall be third generation LED and shall be manufactured by Code 3 or Federal Signal and Sign. All emergency lighting components shall be from the same manufacturer. Components of the emergency lighting package shall be as stated below:

- Upper Zone-A, low profile, minimum 69" Code 3 LED Light Bar model # 2169-ALRC-113-LED or an equal Federal Signal Argent Light Bar, w/Cal Steady Front Red
- Lower Zone-A, Two, (2) Code 3 LED model # LXEX1F or equal Federal Signal Quadra Light, grill or bumper mounted
- Front Lower Zone-B&D, Code 3 LED model # LXEX1F or equal Federal Signal Quadra Light
- Rear Upper Zone-B&D, Code 3 LED model # LXEX2F or equal Federal Signal Quadra Light
- Rear Lower Zone-B&D, Code 3 LED model # LXEX1F or equal Federal Signal Quadra Light
- Upper Zone-C, Two (2) Code 3 LED model # LXEX2F or equal Federal Signal Quadra Light
- Lower Zone-C, Two (2) Code 3 LED model # LXEX1F or equal Federal Signal Quadra Light

NOTE: All perimeter emergency lighting shall be surface mount style and include the appropriate colored lenses with aluminum housings.

The emergency lighting shall be controlled through the siren control head and the halogen work lights shall be controlled by individually lighted and labeled switches.

Light Bar Mounting: The light bar shall be flush mounted as low as possible on the forward portion of cab roof with inside cab support structure added for roof strength.

An amber directional "Arrow" bar shall be mounted, recessed flush into diamond plate above door opening of ladder tunnel.

11.4 HEADLIGHT FLASHER:

A Federal-Signal model # FA4C-RDG (or equal) headlight flasher (wig-wag) for vehicles with day time running lights, 90 FPM with high beam override shall be provided. It shall be activated in the "calling for the right of way" mode and be turned off in the "blocking of the right away" mode by applying the parking brake. Should the feature need to be interrupted, the flasher shall also incorporate a separate cut off switch.

11.5 AIR HORN:

A Grover Model 1510 Stutter Tone Air horn (or equal) with dual foot switches on cab floor shall be provided for officer or driver control. Foot switches shall be LineMaster Model "Compact #491-S" (or equal). Location of mounting to be determined at pre-construction meeting.

SECTION 12 - PAINT AND LABELING

12.1 PAINT/FINISH:

All wiring, hoses, wire looms and gauge backs, shall be left unpainted for identification purposes; no exceptions.

All visible exterior surface areas shall be free of grind marks, dents, peen marks, paint sag, and/or unsightly workmanship. Interior cabinet areas, if painted, are to be well fitted and painted to the same quality of surface finish as the exterior surface standard. When completed, all exterior painted surfaces of the entire apparatus shall be the single color specified RED, except the cab top which shall be white. This includes repainting surfaces (i.e. cab, chassis, etc.) that may have already received factory, OEM or pre-delivery painting. All ferrous components shall be primed and painted before assembly.

After the installation of the midship pump, tow hooks, body hold-down brackets, auxiliary pump framing, fuel tank framing, and prior to the mounting of the tank-body assembly, the entire chassis, undercarriage and installed components shall be thoroughly cleaned (steam or spray) to remove all oil, grease, loose paint, and dirt. All unpainted components and plumbing will be cleaned, primed, and then the entire undercarriage and all components painted specified BLACK.

Upon completion of tank-body assembly, and prior to mounting of assembly on chassis, underside shall be properly cleaned, primed and painted RED. Glazing and primer surface shall be used wherever necessary to provide a smooth surface.

Back of cab, chassis area, and component parts that will be inaccessible for "finish" painting when completed vehicle is to be painted will be cleaned, primed, and painted the specified RED.

Prior to finish painting, the OEM cab exterior paint surfaces will be de-waxed (hot soap wash), wet or dry sanded, and sealed with a "primer-sealer". Surface imperfections will be repaired as necessary, glazed, primed, and readied for finish painting. Finish paint shall be applied in exact sequence and in accordance with paint manufacturer's specifications. Paint is to be specified RED except for top of cab, which is to be white down to the drip molding on both sides, and to the top of the windshield and a line parallel to the top of the rear window.

Any brackets, or other items mounted on the roof and requiring painting shall also be painted white.

Finish paint shall be applied in exact sequence and in accordance with paint manufacturer's specification.

12.2 PAINT SPECIFICATION:

CDF RED: JX7466R Sherwin Williams or equivalent.

White: Sikkens FINA 4146 Autocryl Acrylic Urethane or equivalent.

Touchup paint shall be provided for both colors.

Further clarification shall be provided at the pre-construction conference.

12.3 LETTERING AND STRIPING: *Section deleted.*

12.4 LABEL PLATES:

A test data plate shall be provided at the pump operator's position which gives the rated discharges and pressures together with the speed of the engine as determined by the manufacturer's test for this particular unit. Plate shall also include delivery date, pump serial number(s), original customer, and the apparatus manufacturer's serial number.

The contractor shall affix a permanent plate in the driver's compartment specifying the quantity and type of the following fluids used in the vehicle:

1. Engine Oil
2. Engine Coolant
3. Transmission Fluid
4. Pump Transmission Lubrication Fluid
5. Refrigerant
6. Drive Axle Lubrication Fluid

All label plates and instruction plates shall be metal with the information permanently engraved or stamped thereon.

Label plates shall be installed with double sided adhesive tape designed for that purpose. All label plates shall be color coded and mounted in accordance with NFPA requirements.

SECTION 13 - EQUIPMENT ACCESSORIES

13.1 LICENSE PLATE LOCATION:

A license plate light and holder shall be installed on rear of body. A license plate holder shall be installed on front of body. Both will be specifically located during the pre-construction conference.

13.2 INTERCOM COMMUNICATIONS SYSTEM:

6 stations total - five (5) with radio interface, one (1) without.

In cab – Driver, Officer and two fire fighter positions - intercoms with radio interface.

Pump panel - intercom with radio interface.

Rear Step - For backing purpose, intercom only.

All headsets shall be low impedance, "behind the head" style, compatible with current approved fire fighter head wear and the Kenwood mobile radio. Radio interface shall be connected to the cab radio. Headset provided for backer to have longer cord than others. Interface unit to be mounted on dog house. All connections in areas subject to getting wet shall be waterproofed.

13.3 BACK UP ALARM

An electronic back up alarm shall be provided. it will activate whenever the transmission selector is placed in reverse with the engine operating. (Ref.: Velvac #69770).

13.4 TURN KEY EQUIPMENT:

The following equipment is to be furnished with each unit. The actual placement of the equipment with respect to compartment and/or mount or bracket shall be discussed at the preconstruction conference.

13.4.1 Hose:

Two (2) – Hard Suction, 10' x 6", NH,"KOCHEK MAXI-FLEX", light weight, long handled.

13.4.2 Ladders:

One (1) - 10' Folding Attic Ladder. Ref: DUO-SAFETY Series 585A.

One (1) - 14' Roof Ladder. Ref: DUO-SAFETY Series YGR.

One (1) - 24' Extension Ladder. Ref: DUO-SAFETY Series 900 A.

Halyard to be Wellington Puritan ½" Ladderline.

13.4.3 Miscellaneous:

- 25' of 3/8" air hose with quick change fittings and safety blow gun.
- Two (2) ZICO Model SAC-44 Space-Saver Chock Blocks (or equal) to be mounted in horizontal holders beneath the running boards. Specific locations to be determined at the preconstruction conference.

- Two (2) Lantern, hand, 12 volt, (Ref: Streamlight Vulcon), with charger. Hand lights to be mounted and hardwired in cab at locations to be determined at preconstruction meeting.
- One (1) – Emergency Flare Kit, 3 Triangles, meets or exceeds DOT Specifications, including 40 mph.wind test

13.4.4 Mobile Radio:

Radio: One (1) Kenwood TK 790 with full-featured Front Panel (KCH-11) VHF Hi-Band, CDF 254 Channel Special Version mobile radio shall be provided, installed and programmed with all appropriate frequencies. Radio shall be a deck mount for installation on the doghouse or in a console. Final installation requirements shall be discussed at the preconstruction conference.

13.4.5 Fabricated Brackets / Mounts:

- One set of Hebert (or equal) hose clamp brackets to be mounted in left side through compartment on side of ladder tunnel next to 6" male mounting plate.
- Two Akron Brass Style #2443 (or equal) Hydrant/Spanner wrench holders w/tools to be mounted inside left front and right rear high side compartments, exact location to be determined at pre-construction conference.
- Aluminum plate mount with strap shall be installed for agency supplied Floto-Pump.